

Application Serial No. 10/717,912
Attorney Docket No. 111190.121US1

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in this application:

Listing of Claims:

What is claimed is:

1. (Currently Amended) A system for measuring muscle strength of a human thumb, comprising:

- a first structure contacting at least a portion of a back side of the hand;
- a second structure contacting at least a portion of a palm of the hand, said first and second structures configured to adjustably secure the hand in a substantially fixed position and configured to secure the hand in a substantially neutral position in the pronation-supination plane;
- a ring for receiving a thumb and configured so that the thumb is positioned substantially at the inter-phalangeal joint;
- a load cell comprising electronics to record a force generated by the thumb; and
- a mechanical assembly linking said ring and said load cell to transmit the forces from said ring to said load cell, wherein said mechanical assembly comprises a threaded shaft and a nut, and said ring is configured to transmit the force generated by the thumb to said threaded shaft and said nut.

2. (Cancelled)

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3. (Previously Presented) The system according to claim 1, wherein said mechanical assembly further comprises a beam positioned substantially perpendicular to said threaded shaft, said beam transmitting the load from said threaded shaft to said load cell.

4. (Currently Amended) The system according to claim 1, further comprising a knob for rotating said threaded shaft to adjust the position of said nut on said threaded shaft , and adjusting the position of the ring to receive the thumb such that different forces are generated by the thumb corresponding to different positions of the ring responsive to said knob being adjusted.

5. (Original) The system according to claim 1, wherein said second structure is in a substantially fixed position.

6. (Original) The system according to claim 1, wherein said first structure is movable to secure the hand in the substantially fixed position.

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7. (Previously Presented) The system according to claim 1, further comprising:
a push plate;
at least one push rod contacting said push plate and said first structure;
a bolt secured to said first structure; and
a handle threaded to negotiate said bolt, wherein upon rotating said handle in a first direction, said push plate, said at least one push rod and said second structure move in a direction to adjustably secure the hand in the substantially fixed position.

8. (Currently Amended) The system according to claim 1, wherein said electronics provides the capability to ~~at least one of~~: a) display and record forces in at least one of metric and English units; b) display and record a peak force; c) continuously display, update and record forces generated by the thumb; and d) reset the system prior to a next exertion of force by the thumb.

9. (Original) The system according to claim 1, further comprising a connection whereby data recorded by said system can be transmitted to a computing device.

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10. (Currently Amended) A system for measuring muscle strength of the human thumb, comprising:

means for contacting at least a portion of a back side of the hand;

means for contacting at least a portion of a palm of the hand, at least one of said

means for contacting the back side and said means for contacting the palm

configured to adjustably secure the hand in a substantially fixed position and for securing the hand in a substantially neutral position in the pronation-supination plane;

means for receiving a thumb and for positioning the thumb substantially at the inter-phalangeal joint;

means for recording a force generated by the thumb; and

means for linking said ring and said load cell to transmit the force from said ring to said load cell.

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11. (Currently Amended) A system for measuring muscle strength of the human thumb, comprising:

- a first plate contacting at least a portion of a back side of the hand;
- a second plate contacting at least a portion of a palm of the hand, said first and second plates configured to secure the hand in a substantially fixed position and configured to secure the hand in a substantially neutral position in the pronation-supination plane;
- a ring for receiving a thumb of the hand and configured so that the thumb is positioned substantially at the inter-phalangeal joint;
- a load cell comprising electronics to record a first force generated by the thumb moving in at least a first direction and to record a second force generated by the thumb moving in at least a second direction; and
- a mechanical assembly linking said ring and said load cell to transmit the force from said ring to said load cell.

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12. (Currently Amended) A system for measuring muscle strength of a human thumb, comprising:

- a clamping apparatus to adjustably secure a hand in a substantially fixed position;
- a structure for receiving a thumb of the hand while the hand is in the substantially fixed position and for securing the hand in a substantially neutral position in the pronation-supination plane and for positioning the thumb substantially at the inter-phalangeal joint;
- a force measuring device to record a force generated by the thumb in abduction and adduction directions; and
- a mechanical assembly transmitting the force generated by the thumb to said force measuring device.

13. (Original) The system according to claim 12, wherein said force measuring device continuously records forces generated by the thumb over a finite period of time.

14. (Original) The system according to claim 12, wherein said structure is adjustable with respect to the hand when the hand is in the substantially fixed position.

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15. (Currently Amended) A method for measuring muscle strength of a human thumb, comprising:
adjustably securing a hand in a substantially fixed position comprising a substantially neutral position in the pronation-supination plane;
placing a thumb of the hand substantially at the inter-phalangeal joint in a structure that enables the thumb to generate a measurable force in abduction and adduction directions; and
recording the force in the abduction and the adduction directions.

16. (Original) The method according to claim 15, further comprising:
providing electronics to record the force generated by the thumb; and
providing a mechanical assembly linking the structure to the electronics to transmit the force from the structure to the electronics.

17. (Previously Presented) The method according to claim 15, wherein the thumb can move in at least a first direction and a second direction, and said recording the force includes recording the force in abduction and adduction directions responsive to separate movements of the thumb in the first and second directions.

18. (Original) The method according to claim 15, further comprising the step of adjusting the position of at least a portion of the structure with respect to the hand.

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19. (Currently Amended) The method according to claim 15, further comprising the ~~step of at least one~~ steps of:

- a) displaying the force in at least one of metric and English units;
- b) displaying and recording a peak force generated by the thumb; and
- c) continuously displaying, updating and recording forces generated by the thumb.

20. (Original) The method according to claim 15, wherein the force is recorded by a first system, and further comprising the step of:

transmitting the recorded force to a second system.

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21. (Currently Amended) A system for measuring muscle strength of a thumb or a finger of a hand, comprising:

a securing apparatus to adjustably secure a hand in a substantially fixed position;
a structure, connected to said securing apparatus, to receive the thumb or finger of the hand while the hand is in the substantially fixed position via said securing apparatus and configured to secure the hand in a substantially neutral position in the pronation-supination plane, and configured so that the thumb is positioned substantially at the inter-phalangeal joint;

a force measuring and recording device, responsively connected to said structure, to measure first and second forces generated by the thumb or finger in said structure in abduction and adduction directions respectively, and record the first and second forces to be used in at least one of diagnostic and therapeutic treatment of the thumb or finger.

22. (Original) The system according to claim 21, wherein a quantitative measure of forces generated in pure palmar thumb adduction and abduction to serve as an adjunct to grip and pinch strength in the following conditions:

osteo-arthritis pre-operation and post-operation;
rheumatoid arthritis pre-operation and post-operation;
thumb reconstruction after trauma;
reconstruction of congenital differences;
following tendon transfer surgery; and/or
following tumor resection and reconstruction.

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23. (Original) The system according to claim 21, wherein said system significantly, substantially and/or completely isolates one or more muscles that are enervated by the motor branch of the median nerve or terminal motor branches of the ulnar nerve.

24. (Currently Amended) A method of measuring muscle strength of a thumb or a finger of a hand, comprising at least one of the sequential, non-sequential and sequence independent steps of:

adjustably securing the hand in a substantially fixed position comprising a substantially neutral position in the pronation-supination plane;
receiving the thumb or the finger of the hand in a force measuring device and
positioning the thumb substantially at the inter-phalangeal joint;
measuring the force generated by the thumb or the finger in the adduction directions;
and
transmitting the force generated by the thumb or the finger to be used in at least one of diagnostic and therapeutic treatment of the thumb or finger; and
correlating the force with respect to at least one of age, weight, hand dominance and grip strength.

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25. (Original) The method according to claim 24, wherein a quantitative measure of forces generated in pure palmar thumb adduction and abduction serve as an adjunct to grip and pinch strength in the following conditions:
osteo-arthritis pre-operation and post-operation;
rheumatoid arthritis pre-operation and post-operation;
thumb reconstruction after trauma;
reconstruction of congenital differences;
following tendon transfer surgery; and/or
following tumor resection and reconstruction.

26. (Original) The method according to claim 24, wherein one or more muscles that are enervated by the motor branch of the median nerve are significantly, substantially and/or completely isolated.

27. (New) The method according to claim 24, wherein said correlating step further comprises at least one of the steps of:

correlating at least one of adduction and abduction with grip;
correlating at least one of adduction and abduction with age and weight,
correlating at least one of adduction and abduction with right and left grip; and
correlating at least one of adduction and abduction with right and left hand.